Q. Uh-huh.
A. So, 1.99 -- which is engineering terms, ROW -- ROW over 2, area times velocity squared. Force equals some coefficient. ROW over 2, area times velocity squared, that will give you a force.
So, if we look at this -- and this gives you a force in pounds.
Q. And you've got to go slow for me. The force that we're talking about is the force of the current?
A. Force of the current on the stern of the vessel.
Q. Okay.
A. Force of the current on the stern of the vessel, some coefficient, ROW over 2. ROW being 1.99, which is 64 pounds of cubic foot salt water. Remember, fresh water is 62.4; salt water is about 1.28 times heavy; 64 pounds per cubic foot, feet, and divided by 32. The area, 5 by 2, makes it real easy; 10 square feet on the stern of the vessel.
And then the velocity --

remember, we talked about 6 knots. Six knots equates to 10 feet per second, roughly. Multiply 6 times 1.69, and you come out with about 10 feet per second.

And 10 by 10 by 10, three tens, area, velocity squared; it's about 1,000 times 1.99 over 2; it's about a one. And the coefficient, easy one to use is one. You can get above one, or you can get below one, depending upon the exact shape of the transom. I don't know what that is.

So, for good numbers, the force is about 1,000 pounds. A thousand pounds pushing on the stern of the vessel. And a 40 horsepower motor cannot produce 1,000 in reverse.

Q. How do you determine the amount of force that the motor can --

A. Well, I have to use again, little analogies. I know what it is on tugs. Big numbers on tugs, 25 pounds per horsepower; big numbers. Remember, big propellers.

Q. Right.
A. And this is a little propeller. And it's not built, really, for thrusting. It's built for something else, generally a higher speed operation. So, I would say under any circumstances, we're not going to get more than 20 pounds of horsepower out of it.
Q. Is there a way that you can determine specifically -- is force the right term?
A. Yeah, force.
Q. That the engine's capable of providing?
A. Sure. I need to know something about the propeller --
Q. Does the manufacturer provide that kind of --
A. No, I'd have to know more about the engine and the propeller. And I don't know that.
Q. Okay.
A. If I saw the engine and the propeller, I could do a calculation on it. I don't have the engine. I don't know the size of the propeller. I don't know who could

give me that.
Q. And these aren't things that the manufacturer just puts out?
A. Yeah, but I'd have to know something about what propeller was on that vessel -- that particular engine. I don't know that. All I'd need to do is see the engine. I could do a calculation on all this. But, it doesn't make any difference. All I'd have to do is find out whether or not this engine is capable of pushing or pulling this engine -- vessel -- against 1,000 pounds.

We're dealing with something going in the reverse. And engines are not as efficient when going in reverse, compared to going forward. So, there's no way, in my opinion, that this little 40 horsepower engine is going to produce 1,000 thrust.

So, I therefore say it's incapable of maneuvering that little boat under those conditions.
Q. Let me just go through this slowly,

because I want to understand it.
A. Sure.
Q. If the vessel's capable of backing up -- and I think you said before that it got pushed around. But, if it's capable of backing up into the current, isn't it by definition exerting more force than the force that's being exerted against it?
A. Absolutely, sure.
Q. And if your calculation was that it was 1,000 pounds against it, but it's able to back up into the current, then the motor is producing 1,000 pounds?
A. Sure, yes. Or my 1,000 pound calculation is in error, or the current force is in error.
Q. Okay, all these variables.
A. Sure. Exactly.
Q. And we don't know what any of these variables are for the purposes of our discussion right here, do we? We don't know the current.
A. Well, I have some indication of what the current is. No one went down and

measured it.
Q. Right. And we don't know the configuration of the stern, specifically.
A. Right. I have photographs of the stern, but nothing specific.
Q. I mean, if you went down there you'd do measurements first?
A. I would find out what the draft of the vessel is, yes.
Q. Okay, and just for a lay juror or a judge that may be reading this, can you tell us what the draft is?
A. Yeah, I have to calculate testimony that the draft is 2 to 2 1/2 feet. And the freeboard is a foot.
Q. So we can define our terms, draft is?
A. Distance from the water line down to the bottom of the vessel.
Q. And the freeboard is?
A. The water line to the side of the vessel rail, the rail. So we add them both together, and we come out with 3 and 3 1/2 feet. And I think that comes from Mr. Ramsey's statement right after the

casualty. In fact, let me pull that out and make certain my memory is not failing me. [Looking through documents.] No, sorry about that. She draws 2 1/2 to 3 feet of water.

So, 2 1/2 and it has a freeboard of 1 foot. So, 2 1/2 to 3 feet makes it 3 1/2 to 4 feet on the side.

Q. Okay.

A. So, when I say 10 square feet at the stern, it actually could be larger than 10 square feet. When I say 10, 5 feet by 2 feet, it could actually be 5 feet by 3 feet, which is 15 square feet.

Q. Let me ask you to pin down for me what role you think the fact that the engine may have been undersized had to do with causing the casualty. Because he was certainly able to back up -- well, let me not put words in your mouth --

A. No, he wasn't able to back up.

Q. Tell me, tell me.

A. Because he got broadsided. In other words, his port side got into the rake.

He wasn't able to back out.
Q. Well, is it your understanding that the motor hadn't stalled at that point?
A. When the motor stalled, I don't know. But, in any event, all I know is he got port side, --
Q. No, no, but if he's --
A. He's trying to get back out. And I think his testimony is, his bow is to the stern of the barge, that is, the dredge.
Q. Uh-huh.
A. And that's all I hear. And I don't hear that he got away from it, that he actually backed out.
Q. This is right before it sunk, you mean?
A. Yes, yeah. Let's go through the testimony again.
Q. Okay, go ahead.
A. He comes in and he actually floats in, originally. Remember, the current is bringing him in.
Q. That's right.
A. They give him a line, and he ties up at that point.

Q. Right.
A. And at that point, depending upon which story -- somebody says, *"Get around to the other side,"* and someone says, *"Well, I never said that."* But, in any event, he decides to get the thing started again, to bring it around to the other side. And he's fooling around with it a little bit. And someone else was helping him. And then they left and he fooled around with it a little bit more. And he finally got it started. And at that point, he wanted to back out. And remember, a couple of wires are crossing. He has to back out.

And I don't know at what point, but he says he got the vessel turned around such that his bow is facing the stern of the dredge.
Q. Where he's leaving from, right?
A. Right. And at that point, something happens and he swings around to port and gets trapped under the rake of the other barge.

Q. Okay.
A. And I don't know how far he got away.
Q. Let me ask you this question -- continue.
A. As soon as he got trapped, that's the end of the story.
Q. Okay, and the engine being undersized goes to him not being able to get away from the rake --
A. Right, right.
Q. -- of the other barge?
A. Right, or do any maneuvering with it.
Q. Okay, if we assume, hypothetically, that the engine had stalled prior to him impacting the rake of the other barge, --
A. The first time or the second time, now? Did he get away or not get away?
Q. Well, we know he didn't get away, right?
A. Right, we know he didn't get away.
Q. And the boat, the skiff, started to capsize.
A. No, it twisted around. Remember, he's headed -- the bow of his vessel is pushed against the stern of the dredge. And then it swings around such that his port

side goes under the rake of the other barge. It rotates.
Q. Okay.
A. And then the --
Q. Well, let's --
A. -- forces of current pushed the starboard side down, his port side goes up the rake.
Q. And you mentioned he couldn't get away from the rake of the barge.
A. Right.
Q. If we assume at the point that the skiff impacted the rake of the barge, if we assume that the motor had stalled at that point, whether or not it's undersized had nothing to do with this incident.
A. No.
Q. I just want to make sure there's no other --
A. Once he stalled and he couldn't get it started again, he's trapped.
Q. Okay.
A. And even if he got it started again, I don't think he could have gotten away

from the rake. He was caught under that.
Q. Have you formed any other opinions that you intend to testify to that aren't contained in this report?
A. There's another one that I picked up. And it has to do with the lack of radio communication. And that comes about in the statement, page 17, *"Where there any problems with the radio?"* And he says, *"Yeah, the radios were not working. We couldn't contact each other. The only radio that worked was my own personal handheld radio."* In this day of modern communications, just about everyone -- and certainly on the river, and I'd like to believe on these construction jobs -- has a radio so that they can talk to each other.
Q. A handheld radio?
A. Handheld radio. And he's just indicating they weren't working.
Q. These are the handheld radios?
A. I assume, or one can assume that.
Q. Most skiffs and outboard motors don't

have -- the skiff that we're talking about, most of them aren't equipped with radios.

A. Oh, no, no. It would be something you hand held or put on your belt, or something.

Q. You're not a radio expert?

A. No, all I say is that in my opinion when you're working on these commercial ventures, everyone stays in contact with everyone else.

Q. Do you have any understanding that a lack of a radio caused or contributed to the incident?

A. No, I'm just saying that these were all surrounding -- is there a contribution? Possibly somewhere, due to lack of communication. But outside of that, I don't know what to say about it. It's basically stalling, in other words, the vessel having an engine that's unseaworthy, or the vessel's unseaworthy because of a lack of a proper engine.

Q. Okay, now --

A. And then we have something with the vessel being unseaworthy because it's underpowered for operating in those environmental conditions.
Q. It's fair to say that a well-maintained engine can stall under certain circumstances?
A. Sure, you run out of fuel.
Q. Other reasons, too? I mean, we've all broken down in our cars, and --
A. Yeah, but a lot of the breaking down in cars has to do with lack of maintenance, for example. If a fuel filter is torn, that's a lack of maintenance.
Q. Okay, you maintain your car well? I trust you do? Give yourself an A for car maintenance? Have you ever broken down?
A. No, not since I've been 17, --
Q. Really?
A. -- when I ran out of fuel. Never again did I ever run out of fuel. My car has never stalled. I don't have that personal experience, except when I was 17 and ran out of fuel. Never again.

Q. But you accept as a general proposition, don't you, that a person who regularly takes their car in, by the book, for maintenance, can still run into a problem?

A. Oh, absolutely you can run into a problem. I know, personal experience in my family, that these fan belts fail. Actually, it was a timing belt on a foreign car. And they're supposed to be changed at 75,000 miles. At 30,000 miles, this thing broke on the road, and the engine just stopped on a thruway. We did not buy foreign cars of that manufacturer thereafter.

But, in any event, yes, certainly it can happen. But, remember, that gave no warning or anything else. This [indicating] gave warning. People knew about the problem before it actually led to a serious accident. This breaking of a timing belt gave no warning, absolutely. And the manufacturer said, *"Don't worry about it until you get*

70,000 miles on it."

This is not that situation. This is a situation where it's open and obvious there's a problem. Fix it.

Q. Have you formed any other opinions? And, you know, I just don't want to be surprised.

A. No, I don't intend -- I try to write everything in my report the first time.

Q. I appreciate that.

A. And give full disclosure and use my file. And I think it's relatively simple what's going on here; improper repair and operating a vessel with this engine in swift currents of the Barnegat Bay Inlet. And knowing about the problem with the engine, and not doing anything about it, and then having an undersized engine for this particular boat.

And that's the story here. The little thing about the radio, it's just another thing that was not operating properly that adds to the unseaworthiness condition that existed on this vessel.

But did that cause the actual casualty, or contribute to it? Perhaps in a minor matter.

Q. Have you been asked to form any further opinions? Do you anticipate --

A. Well, I haven't read any of the log books, nor the massive documents that were provided this morning. I don't know whether there's anything in those or not. But, I have not reviewed them.

Q. So, it's fair to say as you sit here right now, no one's asked you --

A. No one's asked me to do anything further, except, I think, certainly Mr. Rosenthal was talking to me in terms of reviewing the log books.

Q. Okay.

A. But, I am not interested in reviewing financial records or things like that, which I understand were also provided.

MR. ROSENTHAL: Not many.

THE WITNESS: Oh.

MR. ROSENTHAL: I mean, basically, it's the labor log and the log

book.
Q. I think we're winding down. Is there anything you want to add or you think we ought to know?
A. I try to keep it simple; no.
MR. MURPHY: I'm just going to take one second to check on something out there.
MR. ROSENTHAL: Sure.
MR. MURPHY: I'll be right back.
(Recess 10:25 a.m. - 10:30 a.m.)
Q. You're testifying in this case as a naval architect.
A. Correct.
Q. And I understand your previous testimony that you're a designer of vessels and that sort of thing.
A. Yes.
Q. I want to hone in more on your experience with outboard motors. As a naval architect, you don't design outboard motors, do you?
A. I do not design outboard motors.
Q. And have you ever worked in the

maintenance and repair of outboard motors?

A. Only my own outboard motors.

Q. So you've never done that professionally?

A. No.

Q. And do you have any training regarding the maintenance and repair of outboard motors?

A. Only to the extent that I'm involved with them in other cases, and one has to be familiar with the particular outboard motor. At that point, it's generally investigating the motor by seeing it, hands-on with the motor, taking things apart on the motor, having the manufacturer's instructions on the motor and maintenance on the motor.

Q. You mention that you've owned outboard motors.

A. Oh, yeah.

Q. What's that history?

A. Well, Evinrudes, I've had when I was younger. I don't have them right now.

Q. How many, when?